

*Creating an ECO online Natural Fit Virtual Programs to Prepare Students for
boosting 21st century Skills 4 the Future (UNITY)*

2021-1-SE01-KA220-SCH-000032448

*STE(A)M-focused PBL for transferring 2021st skills for fighting against
climate change*

LESSON PLAN 8:

Renewable Energy – Solar Energy

Presented by Fthia in Action team

Lesson procedure:

Date:	___/___/___
Teaching staff:	Mr/Mss/Ms
Term:	2022-2023
Week:	1
Year Level:	Primary/low secondary (6-15 years old)
Time/length	1-2 hour.
Key Learning Area:	Use of soft skills for climate change and blending interdisciplinary subjects, including science, math, art and social studies
Topic/focus:	Use of renewable energy for climate purposes practically and SMARTLY.
Lesson Name: Use of solar energy for energy saving and transferring STEAM skills.	
Foreseen Outcomes:	
At the end of this lesson, students will be able to:	
<ul style="list-style-type: none"> ✓ understand the roles and importance of renewable energy for climate change, ✓ communicate with public authorities, persuading them for renewable energy, ✓ run small-scale campaigns, relevant to renewable energy, specifically solar energy, ✓ design posters and brochures, relevant to environment issues, ✓ improve their social skills, including group communication, interaction and discussion, 	
Lesson Description:	
This lesson shall demonstrate what renewable resources are especially solar energy, how it works, where to use it, how to use it, what requirements are needed, how it helps the environment and simple project to show how solar energy can be transformed to other kinds of energy (kinetic).	
Pre-requisites to this lesson plan (not applicable):	

Length (Lesson procedure):

This lesson will take 1-2-hour, which also includes interdisciplinary learning.

Depending on how to implement the planned lesson, the teacher shall need some materials, including videos, comics, papers, cans, tape and some wire. The teaching staff shall follow the following steps to implement the lesson successfully:

Step 1. Lead in:

Teacher greets the students, and asks what they know about renewable energy. After collecting the feedback from the students, the teacher asks for grouping in accordance with the students' learning intelligence and or learning style. Here, teacher group students as:

- ✓ Group A: 2-3 students, having science learning interest/intelligence/capability/style
- ✓ Group B: 2-3 students, having technology learning interest/intelligence/capability/style.
- ✓ Group C: 2-3 students, having engineering (creativity) learning interest/intelligence/capability/style.
- ✓ Group D: 2-3 students, having art learning interest/intelligence/capability/style.
- ✓ Group E: 2-3 students, having math learning interest/intelligence/capability/style.

Note: As grouping the students, the number of students can change according to the class-size.

Lesson standard:

The lesson is standardized around STEAM-focused PBL for transferring 2021st skills for fighting against climate change. Here, we focus on the role of renewable energy, specifically solar thermal energy. Through creating and performing, the students will understand how solar thermal energy is produced. Regarding this, it can be expected that understanding the role of renewable energy for climate change and future of energy saving is proceeded.

Common Core State Standards:

The teacher shall connect and correlate the lesson with the national syllabus and or program, which shall incorporate the lesson with national program.

Enduring Understandings:

The students will understand the core ideas and philosophy behind renewable energy, specifically solar thermal energy. The learning outcomes of the lesson shall be used by the students in their future careers. Besides, the lesson is connected with following areas:

- ✓ soft skills development,
- ✓ interdisciplinary learning,
- ✓ blended/hybrid learning,

The lesson will also answer the following questions:

- ✓ Is the lesson transferable for skills development?
- ✓ Can it be teachable over and over again?
- ✓ Does it connect to real-life issues?

Essential Questions:

- ✓ What are the connections of renewable energy with STEAM skills?
- ✓ What are the connections of renewable energy with PBL?
- ✓ How can solar tower building lead to transfer of soft skills?

Before the lesson implementation, the teaching staff shall brainstorm the above questions with the colloquies at the same school.

Case section:

The teacher shall follow the following steps:

Step 1. Creation of the case:

Due to the energy crisis, renewable energy seems like the only solution. As a demonstration lesson the teacher shall use visuals, posters, videos, etc. Then, the teacher asks the following questions to the students who are grouped in 'Step 1. Lead in'. Each question is asked to the students who are grouped from A to E.

Questions for group A (Science-minded students):

- ✓ If you design a solar tower how would it be?
- ✓ Where would you use the solar tower?
- ✓ What purposes would you use for solar energy?

Questions for group B (Technology-minded students):

- ✓ How would you add technology in a solar tower, if you were an expert?
- ✓ What aspects of technology would you use and or benefit in creating a solar tower?
- ✓ What technological design would you use, if you create a solar tower?

Questions for group C (Engineering-minded students):

- ✓ Where would you set the solar towers and for what purposes?
- ✓ Who would work with building a solar tower?
- ✓ What static design would you use in building a solar tower?

Questions for group D (Art-minded students):

- ✓ Can you design a poster for renewable energy, especially solar energy?
- ✓ Can you compose a song for sharing it?
- ✓ What campaign would you run for increasing the use of solar energy in your local community?

Questions for group E (Math-minded students):

- ✓ How can you define the right location of the solar tower?
- ✓ What amount of energy does and or can the tower produce?
- ✓ What calculation would you use?
- ✓ How do you calculate its cost?

The teacher first elicits the answers and then leads to the students taking actions and making a small solar tower from aluminum cans and other materials.

Skill focus:

During the lesson, Cognitive Skills, such as decision making, problem solving, creative thinking and interpersonal skills will be the focus.

Content:

Building knowledge on renewable energy and especially solar energy through STEAM-focused PBL approach.

Assessments:

The teacher will use summative assessments employed in this lesson to gauge student learning.

Evidence of Student Learning:

Students' learning evidence will be the quotes, graphics, pictures, prototype, song, posters etc. that they improved during the lesson.

Texts/Resources:

Teacher uses the needy sources for the implementation of this lesson: The resources/texts are to be created by the teacher (Please see the annex 1 attached under the lesson plan, which are to be used for this lesson).

Learning Activities:

A series of tasks the student will engage in over the lesson. The activities are based on what students need to understand and be able to do for the performance and are aligned to the defined standards "Renewable energy- Solar energy" and the essential questions defined under "Case section"

Practice:

Teacher will deeply explain the negative effects of climate change and the roles of solar energy for energy saving and skills transfer. Here, the teacher shall elaborate or describe the lesson using these prompts provided).

The teachers shall create a flexible learning environment for the students. Here, the teacher uses:

Warm-up: ask about the questions and make the students ready for learning for the topic-specific subject.

Practice: The teacher sets-up demonstration/modeling (I do-we do-you do)
Studio/Rehearsal/Workshop (students engage in creating/planning/refining).

Clean-up: During the procedure, the teacher walks around the class and observes the students on what they need and control. If the students have questions, the teacher answers them.

Suggested Extensions:

- ✓ The teacher may arrange a solar thermal farm visit for the students.
- ✓ The students can do a project by using solar panels to create small lamps in glass jars.

